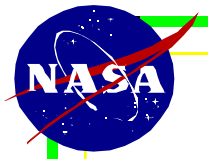


Network Management and Troubleshooting — a Guide for Administrators and Users

Presentation Contents

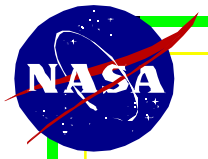
- Network Planning and Management
- Network Environmental Considerations
- Network Troubleshooting

Network Planning and Management

- **Physical Layer Planning**
  - Create physical and logical maps of LAN/MAN/WAN
  - Drop cables down walls, install wallplates
  - Map out where all cables start and end
  - Map out location of all network equipment

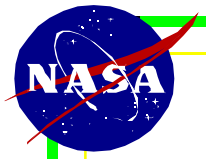
Network Planning and Management

- **Planning ahead**
  - Allow for ports on hubs for every network interface card, use expandable multimedia hubs with redundant power supplies
  - Be sure to order the proper interface, router, and software
  - Recommend stocking 10% of critical network components as spares



SNMP—What is it?

- A protocol for Internet network management services.
- Formally specified in a series of related RFC documents.



SNMPv2

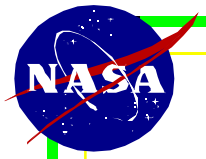
- SNMPv2 is a revised protocol which includes improvements to SNMP in the areas of:
  - Performance
  - Security
  - Confidentiality
  - Manager-to-manager communications.

SNMP Data

- Stored as a Management Information Base (MIB)
- A MIB is a collection of objects which describe an SNMP manageable entity, eg router
- MIB-I was the first SNMP MIB accepted as standard

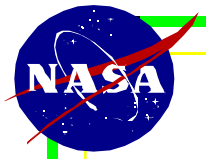
SNMP Data

- MIB-II added some much-needed objects, and has become the standard SNMP MIB
- SNMPv2 expands upon MIB-II with new groups and objects, and is therefore not MIB-II but includes MIB-II



SNMP Data Structures

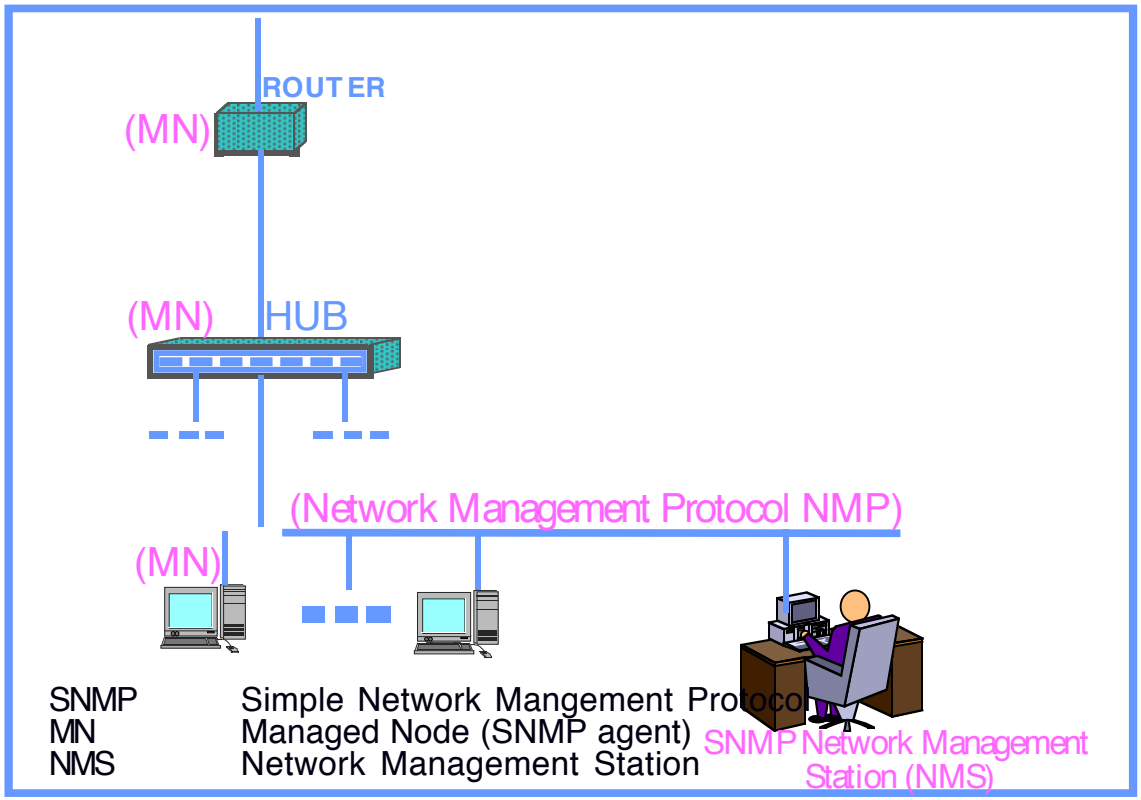
- MIB structure must meet 2 objectives:
  - The object or objects used to represent a particular resource must be the same at each node
  - A common scheme for representation must be used to support interoperability
- Met by a common Structure of Management Information (SMI)



Enterprise MIB's

- A MIB created by an enterprise [company] to define a set of objects that are related to some product[s] from this enterprise
- The enterprise agrees to make the MIB public so that network managers can use it to manage products from this enterprise.

Network Management Model



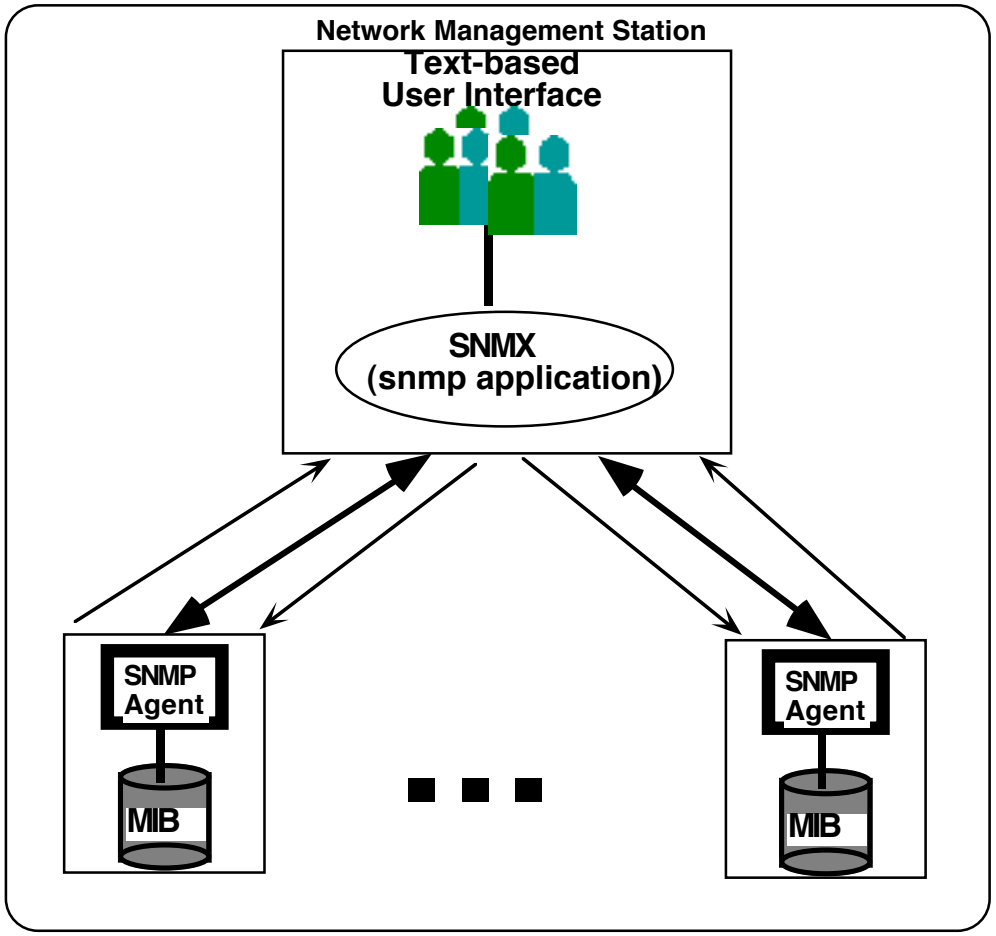
ADNET

Network Management Model

The SNMP agent is responsible for the following duties:

- **Collecting and maintaining information about itself and its local environment**
- **Responding to manager commands to alter the local configuration or operating parameters**

SNMP Architecture



Network Planning and Management

- **Factors to consider w/Network Management**
  - **Cost (hardware and software)**
  - **Integration (will it work with existing system/ network?)**
  - **Modular Design (all in 1 box, what about failures?)**
  - **Monitoring - what will this package do? limitations?**
  - **Enhancement - will more staff be required/ additional training**

Network Planning and Management

- **Products Available**
  - **Cable Plant Management Systems**
  - **Help Desk Software**
  - **Network Data Collection Software, eg SNMP**
  - **Network Monitoring Hardware, eg Sniffer, LanAlyzer**

Environmental Considerations

- Uninterruptable Power Supply (UPS)
  - Allow time for orderly shutdown in case of utility failure
  - Advisable for most important servers and network equipment
  - Sufficient power for all hosts - allow 50% ceiling over estimated requirements
  - Put each server on different circuit to minimize impact of failure

Environmental Considerations

- Standby Power Supply (SBS)
  - Protect smaller network equipment from surges, brownouts and short failures.
  - Advisable for bridges, smaller routers and servers
- Surge Protectors
  - Provide some protection against power spikes
  - Advisable for anything plugged into wall socket

Environmental Considerations

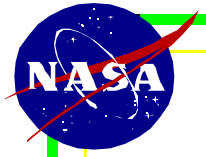
- Dust
  - Can clog cooling vents and cause overheating
  - Control by vacuuming regularly
- Temperature
  - Avoid extremes, particularly heat
  - Computer rooms should be temperature controlled

Environmental Considerations

- Moisture
  - Keep cables away from likely areas of water accumulation (basements, conduit)
  - Excessive dampness/humidity will corrode connectors
- Electro Magnetic Interference (EMI)
  - Keep equipment away from copier rooms, elevator/electrical shafts
  - Route cables away from fluorescent light fixtures, particularly unshielded cabling

Environmental Considerations

- Stability
  - How often do people move?
  - Does network design allow new users to be up and running quickly
  - Will unplugging users bring whole LAN down



Environmental Considerations

- Dispersion
  - Consider MAN/WAN options for widely dispersed users
- Distribution
  - How are users grouped - can the LAN be bridged or routed according to distribution of workload?

Environmental Considerations

- Security/Physical Integrity
  - Are cable runs protected from accidental breakage during construction periods
  - Does network topology allow easy connection/disconnection of users
  - Use tie wraps to secure trunk and AUI cables
  - Cables should not be bent too much - generally between 4 and 20 times cable outside diameter

Environmental Considerations

- Conduits
  - Will existing conduit support expansion of the cabling
  - Is conduit water proof
  - Does it meet local building codes?
- Fire Codes
  - Use Plenum rated cable for ducts or risers
- Accessibility
  - Can technicians access cables

Network Troubleshooting — Thick Ethernet Cables

- Check that the transceiver (AUI) cable is securely attached at both ends
- Make sure the transceiver is tapped to the trunk cable
- Check that the cable is properly terminated at both ends
- Inspect the trunk for twists or bends

Network Troubleshooting — Thin Ethernet Cables

- Check all BNC and T-Connectors
- Check both terminators
- T connectors should be directly connected to NIC's
- Inspect and check all 10 Base T cables for opens/shorts

Network Troubleshooting — Twisted Pair Cables

- Check link LED on hub port
- Inspect RJ45 connectors for correct pinouts and wire connections
- Check trunk port for activity
- Switch cable to different port
- Does port activity LED on Hub flash when machine tries to transmit?

Network Troubleshooting — NIC Testing

- Power off machine, remove power cable
- Disconnect all cables from card
- Open case to allow access to card
- Check for proper installation of the card in the expansion slot
- Inspect the card for proper dip/jumper settings, if applicable

Network Troubleshooting — NIC Testing

- Ensure that all card settings (INT, Base I/O) match driver settings
- Reinstall card and cables
- Boot PC and run diagnostics, including external loop back diagnostics, check all settings
- Swap NIC for one known to work
- Remove all other expansion cards